

SEQUENCE LISTING

<110> Cahoon, Edgar B.
Kinney, Anthony J.
Cahoon, Rebecca E.

<120> Plant Diacylglycerol Acyltransferases

<130> BB-1295

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<150> 60/110,602

<151> 1998-12-02

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 35 40 45
 Pro Ser Asp Asp Val Gly Ala Pro Ala Asp Val Arg Asp Arg Ile Asp
 50 55 60
 Ser Val Val Asn Asp Asp Ala Gln Gly Thr Ala Asn Leu Ala Gly Asp
 65 70 75 80
 Asn Asn Gly Gly Gly Asp Asn Asn Gly Gly Gly Arg Gly Gly Gly Glu
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 Gly Arg Gly Asn Ala Asp Ala Thr Phe Thr Tyr Arg Pro Ser Val Pro
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 Ala His Arg Arg Ala Arg Glu Ser Pro Leu Ser Ser Asp Ala Ile Phe
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 130 135 140
 Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly Trp
 145 150 155 160
 Leu Ile Arg Thr Asp Phe Trp Phe Ser Ser Arg Ser Leu Arg Asp Trp
 165 170 175
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 Val Tyr Val Thr Leu Arg Cys Asp Ser Ala Phe Leu Ser Gly Val Thr
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 Asn Pro Glu Val Ser Tyr Tyr Val Ser Leu Lys Ser Leu Ala Tyr Phe
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Gly	Ile	Met	Phe	Gln	Val	Pro	Leu	Val	Phe	Ile	Thr	Asn	Tyr	Leu	Gln	465	470	475
Glu	Arg	Phe	Gly	Ser	Thr	Val	Gly	Asn	Met	Ile	Phe	Trp	Phe	Ile	Phe	485	490	495
Cys	Ile	Phe	Gly	Gln	Pro	Met	Cys	Val	Leu	Leu	Tyr	Tyr	His	Asp	Leu	500	505	510
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Phe Asn Asn Leu Val Ser Asp Pro Ala Thr Thr Cys Phe His Ile Leu
      35             40             45

Phe Thr Thr Phe Glu Ile Val Tyr Pro Val Leu Val Ile Leu Lys Cys
 50             55             60

Asp Ser Ala Val Leu Ser Gly Phe Val Leu Met Phe Ile Ala Cys Ile
 65             70             75             80

Val Trp Leu Lys Leu Val Ser Phe Ala His Thr Asn His Asp Ile Gly
      85             90             95

Lys Leu Ile Thr Ser Gly Lys Lys Val Asp Asn Glu Leu Thr Ala Ala
     100             105             110

Gly Ile Asp Asn Leu Gln Xaa Pro Thr Leu Gly Ser Leu Thr Tyr Phe
     115             120             125

Lys Met Ala Pro Thr Leu Cys Tyr Gln Ala Lys Val Ile Leu Arg Thr
     130             135             140

Pro Tyr Val Arg Lys Gly Trp Leu Val Arg Gln Val Ile Leu Tyr Leu
     145             150             155             160

Ile Phe Thr Gly Leu Gln Gly Phe Ile Ile Glu Gln Tyr Ile Asn Pro
     165             170             175

Ile Val Val Asn Ser Gln His Pro Leu Met Gly Gly Leu Leu Asn Ala
     180             185             190

Val Glu Thr Val Leu Lys Leu Ser Leu Pro Asn Val Tyr Leu Trp Leu
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 Lys Thr Ile Asp Glu Tyr Trp Arg Lys Trp Asn Met Pro Val His Lys
 245 250 255
 Trp Ile Val Arg His Ile Tyr Phe Pro Cys Met Arg Asn Gly Ile Ser
 260 265 270
 Lys Glu Val Ala Val Phe Ile Ser Phe Phe Val Ser Ala Val Leu His
 275 280 285
 Glu Tyr Val Leu Leu Phe Leu His Ile Leu Lys Phe Trp Ala Phe Leu
 290 295 300
 Gly Ile Met Leu Gln Ile Pro Leu Ile Ile Leu Thr Ser Tyr Leu Lys
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 Asn Lys Phe Ser Asp Thr Met Val Gly Asn Met Ile Phe Trp Phe Phe
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 Ile Val Val Asn Ser Gln His Pro Leu Met Gly Gly Leu Leu Asn Ala
 35 40 45
 Val Glu Thr Val Leu Lys Leu Ser Leu Pro Asn Val Tyr Leu Trp Leu
 50 55 60
 Cys Met Phe Tyr Cys Leu Phe His Leu Trp Leu Asn Ile Leu Ala Glu
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 Ile Leu Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn Ala
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 Lys Thr Ile Asp Glu Tyr Trp Arg Lys Trp Asn Met Pro Val His Lys
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 Trp Ile Val Arg His Ile Tyr Phe Pro Cys Met Arg Asn Gly Ile Ser
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Leu Ala Phe Asn Asn Leu Val Ser Asp Pro Ala Thr Thr Cys Phe His
      35          40          45

Ile Leu Phe Thr Thr Phe Glu Ile Val Tyr Pro Val Leu Val Ile Leu
      50          55          60

Lys Cys Asp Ser Ala Val Leu Ser Gly Phe Val Leu Met Phe Ile Ala
      65          70          75          80

Cys Ile Val Trp Leu Lys Leu Val Ser Phe Ala His Thr Asn His Asp
      85          90          95

Ile Arg Lys Leu Ile Thr Ser Gly Lys Lys Val Asp Asn Glu Leu Thr
      100          105          110

Ala Ala Gly Ile Asp Asn Leu Gln Ala Pro Thr Leu Gly Ser Leu Thr
      115          120          125

Tyr Phe Met Met Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg
      130          135          140

Thr Pro Tyr Val Arg Lys Gly Trp Leu Val Arg Gln Val Ile Leu Tyr
      145          150          155          160

Leu Ile Phe Thr Gly Leu Gln Gly Phe Ile Ile Glu Gln Tyr Ile Asn
      165          170          175

Pro Ile Val Val Asn Ser Gln His Pro Leu Met Gly Gly Leu Leu Asn
      180          185          190

Ala Val Glu Thr Val Leu Lys Leu Ser Leu Pro Asn Val Tyr Leu Trp
      195          200          205

Leu Cys Met Phe Tyr Cys Leu Phe His Leu Trp Leu Asn Ile Leu Ala
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Glu Ile Leu Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn

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Ala Lys Thr Ile Asp Glu Tyr Trp Arg Lys Trp Asn Met Pro Val His						
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Lys Trp Ile Val Arg His Ile Tyr Phe Pro Cys Met Arg Asn Gly Ile						
	260			265		270
Ser Lys Glu Val Ala Val Phe Ile Ser Phe Phe Val Ser Ala Val Leu						
	275			280		285
His Glu Val Thr Tyr Leu Leu Phe His Ser Ser Ser Ala Tyr Ile Asn						
	290			295		300
Tyr Ile Val Leu Tyr Phe Gln Met Cys Pro Phe Glu Phe Arg His Ala						
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 20 25 30
 Tyr Gly Asn Tyr Val Asp Pro Glu Asn Met Lys Asp Pro Thr Phe Lys
 35 40 45
 Ser Leu Val Tyr Phe Met Leu Ala Pro Thr Leu Cys Tyr Gln Pro Thr
 50 55 60
 Tyr Pro Gln Thr Thr Cys Ile Arg Lys Gly Trp Val Thr Gln Gln Leu
 65 70 75 80
 Ile Lys Cys Val Val Phe Thr Gly Leu Met Gly Phe Ile Ile Glu Gln
 85 90 95
 Tyr Ile Asn Pro Ile Val Lys Asn Ser Lys His Pro Leu Lys Gly Asn
 100 105 110
 Phe Leu Asn Ala Ile Glu Arg Val Leu Lys Leu Ser Val Pro Thr Leu
 115 120 125
 Tyr Val Trp Leu Cys Met Phe Tyr Cys Phe Phe His Leu Trp Leu Asn
 130 135 140
 Ile Val Ala Xaa Leu Leu Cys Phe Gly Asp Arg Glu Phe Tyr Lys Asp

145		150		155		160
Trp Trp Asn Xaa Lys Thr Val Glu Glu Tyr Trp Arg Met Trp Asn Met						
		165		170		175
Pro Val His Lys Trp Ile Ile Arg His Ile Tyr Phe Pro Cys Ile Arg						
		180		185		190
Xaa Gly Phe Ser Arg Gly Val Ala Ile Leu Ile Ser Phe Leu Val Ser						
		195		200		205
Ala Val Phe His Glu Ile Cys Ile Ala Val Pro Cys His Ile Phe Lys						
		210		215		220
Phe Trp Ala Phe Ser Gly Ile Met Phe Gln Ile Pro Leu Val Phe Leu						
		225		230		240
Thr Arg Tyr Leu His Ala Thr Phe Lys His Val Met Val Gly Asn Met						
		245		250		255
Ile Phe Trp Phe Phe Ser Ile Val Arg Gln Pro Met Xaa Cys Leu Tyr						
		260		265		270
Asn Xaa His Asp Val Met Lys Gln Ala Arg Pro Ser Lys						
		275		280		285

<210> 11
 <211> 254
 <212> DNA
 <213> Oryza sativa

<400> 11
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 tttcaacctg tgcattgttg ttctagttgc agtgaacagc aggcttatta tcgagaactt 180
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<210> 12
 <211> 80
 <212> PRT
 <213> Oryza sativa

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20 25 30	
Phe Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Ile Val Val Leu	
35 40 45	
Val Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly	
50 55 60	
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65 70 75 80	

<210> 13
 <211> 1587

<212> DNA
<213> Oryza sativa

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caggcctttt caacctatgc attgttggtc tagttgcagt gaacagcagg cttattatcg 180
agaacttaat gaagtatggc ttattaataa gagctgggtt ttggtttaat gataaatcat 240
tgcgggactg gccacttcta atgtgttgct ttagtctgcc tgctttcccc ctgggtgcat 300
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<210> 14
<211> 500
<212> PRT
<213> Oryza sativa

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Asp Glu Ala Ala Pro Gly Ser Pro Pro Arg Pro Arg Pro Arg Pro Arg
35 40 45
Pro Arg Gly Gly Asp Ser Asn Gly Arg Ser Val Leu Arg Pro Gly Gly
50 55 60
Gly Gly Gly Arg Gly Gly Gly Gly Asp Phe Ser Ala Phe Thr Phe Arg
65 70 75 80
Ala Ala Ala Pro Val His Arg Lys Ala Lys Glu Ser Pro Leu Ser Ser
85 90 95
Asp Ala Ile Phe Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Ile
100 105 110
Val Val Leu Val Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met
115 120 125

Lys	Tyr	Gly	Leu	Leu	Ile	Arg	Ala	Gly	Phe	Trp	Phe	Asn	Asp	Lys	Ser	130	135	140
Leu	Arg	Asp	Trp	Pro	Leu	Leu	Met	Cys	Cys	Leu	Ser	Leu	Pro	Ala	Phe	145	150	155
Pro	Leu	Gly	Ala	Phe	Ala	Val	Glu	Lys	Leu	Ala	Phe	Asn	Asn	Val	Ile	165	170	175
Thr	Asp	Ala	Val	Ala	Thr	Cys	Leu	His	Ile	Phe	Leu	Ser	Thr	Thr	Glu	180	185	190
Ile	Val	Tyr	Pro	Val	Leu	Val	Ile	Leu	Lys	Cys	Asp	Ser	Ala	Val	Leu	195	200	205
Ser	Gly	Phe	Leu	Leu	Ile	Phe	Ile	Ala	Cys	Ile	Val	Trp	Leu	Lys	Leu	210	215	220
Val	Ser	Phe	Ala	His	Thr	Asn	His	Asp	Ile	Arg	Gln	Leu	Thr	Met	Gly	225	230	235
Gly	Lys	Lys	Val	Asp	Asn	Glu	Leu	Ser	Thr	Val	Asp	Met	Asp	Asn	Leu	245	250	255
Gln	Pro	Pro	Thr	Leu	Gly	Asn	Leu	Ile	Tyr	Phe	Met	Met	Ala	Pro	Thr	260	265	270
Leu	Cys	Tyr	Gln	Pro	Ser	Tyr	Pro	Arg	Thr	Ser	Cys	Val	Arg	Lys	Gly	275	280	285
Trp	Leu	Ile	Arg	Gln	Ile	Ile	Leu	Tyr	Leu	Ile	Phe	Thr	Gly	Leu	Gln	290	295	300
Gly	Phe	Ile	Ile	Glu	Gln	Tyr	Ile	Asn	Pro	Ile	Val	Val	Asn	Ser	Gln	305	310	315
His	Pro	Leu	Lys	Gly	Gly	Leu	Leu	Asn	Ala	Val	Glu	Thr	Val	Leu	Lys	325	330	335
Leu	Ser	Leu	Pro	Asn	Val	Tyr	Leu	Trp	Leu	Cys	Met	Phe	Tyr	Ala	Phe	340	345	350
Phe	His	Leu	Trp	Leu	Ser	Ile	Leu	Ala	Glu	Ile	Leu	Arg	Phe	Gly	Asp	355	360	365
Arg	Glu	Phe	Tyr	Lys	Asp	Trp	Trp	Asn	Ala	Lys	Thr	Ile	Asp	Glu	Tyr	370	375	380
Trp	Arg	Lys	Trp	Asn	Met	Pro	Val	His	Lys	Trp	Val	Val	Arg	His	Ile	385	390	395
Tyr	Phe	Pro	Cys	Met	Arg	Asn	Gly	Ile	Ser	Lys	Glu	Val	Ala	Val	Leu	405	410	415
Ile	Ser	Phe	Leu	Val	Ser	Ala	Val	Leu	His	Glu	Ile	Cys	Val	Ala	Val	420	425	430
Pro	Cys	Arg	Ile	Leu	Lys	Phe	Trp	Ala	Phe	Leu	Gly	Ile	Met	Leu	Gln	435	440	445

Ile Pro Leu Ile Val Leu Thr Ala Tyr Leu Lys Ser Lys Phe Arg Asp
 450 455 460

Thr Met Val Gly Asn Met Ile Phe Trp Phe Phe Phe Cys Ile Tyr Gly
 465 470 475 480

Gln Pro Met Cys Leu Leu Leu Tyr Tyr His Asp Val Met Asn Arg Ile
 485 490 495

Glu Lys Ala Arg
 500

<210> 15
 <211> 1942
 <212> DNA
 <213> Glycine max

<400> 15
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 aaaaaaaaaa aaaaaaaaaa aa 1942

<210> 16
 <211> 504
 <212> PRT
 <213> Glycine max

<400> 16
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 Asn Ser Pro Glu Thr Thr Thr Asp Ser Ser Gly Asp Asp Leu Ala Lys
 35 40 45
 Asp Ser Gly Ser Asp Asp Ser Ile Asn Ser Asp Asp Ala Ala Val Asn
 50 55 60
 Ser Gln Gln Gln Asn Glu Lys Gln Asp Thr Asp Phe Ser Val Leu Lys
 65 70 75 80
 Phe Ala Tyr Arg Pro Ser Val Pro Ala His Arg Lys Val Lys Glu Ser
 85 90 95
 Pro Leu Ser Ser Asp Thr Ile Phe Arg Gln Ser His Ala Gly Leu Phe
 100 105 110
 Asn Leu Cys Ile Val Val Leu Val Ala Val Asn Ser Arg Leu Ile Ile
 115 120 125
 Glu Asn Leu Met Lys Tyr Gly Trp Leu Ile Lys Ser Gly Phe Trp Phe
 130 135 140
 Ser Ser Lys Ser Leu Arg Asp Trp Pro Leu Phe Met Cys Cys Leu Ser
 145 150 155 160
 Leu Val Val Phe Pro Phe Ala Ala Phe Ile Val Glu Lys Leu Ala Gln
 165 170 175
 Arg Lys Cys Ile Pro Glu Pro Val Val Val Val Leu His Ile Ile Ile
 180 185 190
 Thr Ser Thr Ser Leu Phe Tyr Pro Val Leu Val Ile Leu Arg Cys Asp
 195 200 205
 Ser Ala Phe Val Ser Gly Val Thr Leu Met Leu Phe Ser Cys Val Val
 210 215 220
 Trp Leu Lys Leu Val Ser Tyr Ala His Thr Asn Tyr Asp Met Arg Ala
 225 230 235 240
 Leu Thr Lys Leu Val Glu Lys Gly Glu Ala Leu Leu Asp Thr Leu Asn
 245 250 255
 Met Asp Tyr Pro Tyr Asn Val Ser Phe Lys Ser Leu Ala Tyr Phe Leu
 260 265 270
 Val Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg Thr Pro Tyr
 275 280 285
 Ile Arg Lys Gly Trp Leu Phe Arg Gln Leu Val Lys Leu Ile Ile Phe
 290 295 300
 Thr Gly Val Met Gly Phe Ile Ile Asp Gln Tyr Ile Asn Pro Ile Val
 305 310 315 320
 Gln Asn Ser Gln His Pro Leu Lys Gly Asn Leu Leu Tyr Ala Thr Glu
 325 330 335
 Arg Val Leu Lys Leu Ser Val Pro Asn Leu Tyr Val Trp Leu Cys Met

340					345					350					
Phe	Tyr	Cys	Phe	Phe	His	Leu	Trp	Leu	Asn	Ile	Leu	Ala	Glu	Leu	Leu
		355					360					365			
Arg	Phe	Gly	Asp	Arg	Glu	Phe	Tyr	Lys	Asp	Trp	Trp	Asn	Ala	Lys	Thr
	370					375					380				
Val	Glu	Asp	Tyr	Trp	Arg	Met	Trp	Asn	Met	Pro	Val	His	Lys	Trp	Met
385					390					395					400
Ile	Arg	His	Leu	Tyr	Phe	Pro	Cys	Leu	Arg	His	Gly	Leu	Pro	Lys	Ala
			405						410					415	
Ala	Ala	Leu	Leu	Ile	Ala	Phe	Leu	Val	Ser	Ala	Leu	Phe	His	Glu	Leu
			420					425					430		
Cys	Ile	Ala	Val	Pro	Cys	His	Ile	Phe	Lys	Leu	Trp	Ala	Phe	Gly	Gly
	435						440					445			
Ile	Met	Phe	Gln	Val	Pro	Leu	Val	Leu	Ile	Thr	Asn	Tyr	Leu	Gln	Asn
	450					455					460				
Lys	Phe	Arg	Asn	Ser	Met	Val	Gly	Asn	Met	Ile	Phe	Trp	Phe	Ile	Phe
465					470					475					480
Ser	Ile	Leu	Gly	Gln	Pro	Met	Cys	Val	Leu	Leu	Tyr	Tyr	His	Asp	Leu
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			500												

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 <212> DNA
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 actccatcag cagcgacgcc gccaatcgc aaccgcaaca aaaacaagac actgatttct 240
 ccgtcctcaa attcgcctac cgtccttcg tccccgctca tcgcaaagtg aaggaaagtc 300
 cgctcagctc ccgacaccat tttccgtcag aagtcacgcg gggcctcttc aacctcctgt 360
 atagtaagtc cntgttgctg tgaataagcc gactcatcat tgagaatttt aaatgaaata 420
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<210> 18
 <211> 38
 <212> PRT
 <213> Glycine max

<400> 18
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 1 5 10 15
 Arg Lys Val Lys Glu Ser Pro Leu Ser Ser Asp Thr Ile Phe Val Arg
 20 25 30

Ser His Ala Gly Pro Leu
 35

<210> 19
 <211> 646
 <212> DNA
 <213> Triticum aestivum

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 <223> n = a, c, g, or t

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 <222> (311)
 <223> n = a, c, g, or t

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<400> 19

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tcactttacc cattttccca cttgctgctc tcatgaccgg agaattgggt caaaagaaan 240
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caactncaac aagtgtgtat cangttggcc caacactggt acaaccaatt taccggcan 540
attatanaaa ggtggtcacc ggaactataa agtgtatttt aagcttatgg ctcaaattggc 600
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<210> 20

<211> 39

<212> PRT

<213> Triticum aestivum

<400> 20

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      20                      25                      30

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Met Lys Tyr Gly Leu Leu Ile
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<210> 21

<211> 1975

<212> DNA

<213> Triticum aestivum

<220>

<221> unsure

<222> (93)

<223> n = a, c, g, or t

<400> 21

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ccaaagtatt gaaaaggggt ctacacatgg cagttctatc gatgaggaaa acattaaagg 900
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tcaagataag ttcaagaata caatgggtggg caacatgata ttttggttct tcttcagcat 1560
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gacaaatggc tagttctgtt ttagaagtgc actataacac agatcgtccg aagcaaattg 1680
gcccagaggca atggaggggc ggccctcctta atgtttcgcc atgggctgtt agagcttgct 1740
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cgttccaaat gtatgatatg ccggccgggg tgtgtaccga agatacccca gtgatgaagc 1860
cgaagataac acgacctgcc acatgtgttt tgtgtatacg tttcggttca tgtgccagca 1920
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<210> 22

<211> 508

<212> PRT

<213> *Triticum aestivum*

<400> 22

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Met Ser Lys Gly Asn Pro Asp Pro His Leu Pro Gly Ser Phe Leu Pro
 1          5          10          15

Ser His Gly Gly Pro Pro Pro Lys Pro Lys Thr Pro Pro Arg Thr Phe
          20          25          30

Arg Asn Leu Pro Ser Ser Ser Thr His Gly Pro Ala Pro Ser Val Ala
          35          40          45

Ala Ala Thr Ile Ala Thr Thr Pro Pro Ser Ala Ser Ala Ala Pro Leu
          50          55          60

Pro Pro Thr Val His Gly Glu Ala Ala His Gly Ala Ala Ala Ala Ala
          65          70          75          80

Arg Arg Asp Ala Leu Leu Pro Gly Val Gly Ala Ala His Arg Arg Val
          85          90          95

Lys Glu Ser Pro Leu Ser Ser Asp Ala Ile Phe Arg Gln Ser His Ala
          100          105          110

Gly Leu Leu Asn Leu Cys Ile Val Val Leu Ile Ala Val Asn Ser Arg
          115          120          125

Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly Leu Leu Ile Arg Ala Gly
          130          135          140

Phe Trp Phe Ser Ala Arg Ser Leu Gly Asp Trp Pro Leu Leu Met Cys
          145          150          155          160

Cys Leu Thr Leu Pro Ile Phe Pro Leu Ala Ala Leu Met Thr Glu Lys
          165          170          175

Trp Ala Gln Arg Lys Leu Ile Arg Asp His Val Ser Ile Leu Leu His
          180          185          190

Ile Ile Ile Thr Thr Thr Val Leu Ile Tyr Pro Val Val Val Ile Leu
          195          200          205

Lys Cys Glu Ser Ala Val Leu Ser Gly Phe Val Leu Met Phe Ile Ala
          210          215          220

Ser Ile Thr Trp Leu Lys Leu Val Ser Phe Ala His Thr Asn Tyr Asp
          225          230          235          240

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Ile	Arg	Ile	Leu	Ser	Gln	Ser	Ile	Glu	Lys	Gly	Ala	Thr	His	Gly	Ser	245	250	255
Ser	Ile	Asp	Glu	Glu	Asn	Ile	Lys	Gly	Pro	Thr	Ile	Asn	Ser	Val	Val	260	265	270
Tyr	Phe	Met	Leu	Ala	Pro	Thr	Leu	Cys	Tyr	Gln	Pro	Ser	Tyr	Pro	Arg	275	280	285
Thr	Ala	Phe	Ile	Arg	Lys	Gly	Trp	Val	Thr	Arg	Gln	Leu	Ile	Lys	Cys	290	295	300
Val	Val	Phe	Thr	Gly	Leu	Met	Gly	Phe	Ile	Ile	Glu	Gln	Tyr	Ile	Asn	305	310	315
Pro	Ile	Val	Gln	Asn	Ser	Lys	His	Pro	Leu	Asn	Gly	Asn	Phe	Leu	Asp	325	330	335
Ala	Ile	Glu	Arg	Val	Leu	Lys	Leu	Ser	Val	Pro	Thr	Leu	Tyr	Val	Trp	340	345	350
Leu	Cys	Met	Phe	Tyr	Ser	Phe	Phe	His	Leu	Trp	Leu	Asn	Ile	Leu	Ala	355	360	365
Glu	Leu	Leu	Arg	Phe	Gly	Asp	Arg	Glu	Phe	Tyr	Lys	Asp	Trp	Trp	Asn	370	375	380
Ala	Lys	Thr	Val	Glu	Glu	Tyr	Trp	Arg	Met	Trp	Asn	Met	Pro	Val	His	385	390	395
Lys	Trp	Ile	Val	Arg	His	Ile	Tyr	Phe	Pro	Cys	Ile	Arg	Asn	Gly	Leu	405	410	415
Ser	Lys	Gly	Cys	Ala	Ile	Leu	Ile	Ala	Phe	Leu	Val	Ser	Ala	Val	Phe	420	425	430
His	Glu	Leu	Cys	Ile	Ala	Val	Pro	Cys	His	Ile	Phe	Lys	Leu	Trp	Ala	435	440	445
Phe	Ser	Gly	Ile	Met	Phe	Gln	Ile	Pro	Leu	Leu	Phe	Leu	Thr	Lys	Tyr	450	455	460
Leu	Gln	Asp	Lys	Phe	Lys	Asn	Thr	Met	Val	Gly	Asn	Met	Ile	Phe	Trp	465	470	475
Phe	Phe	Phe	Ser	Ile	Val	Gly	Gln	Pro	Met	Cys	Val	Leu	Leu	Tyr	Tyr	485	490	495
His	Asp	Val	Met	Asn	Arg	Gln	Ala	Gln	Thr	Asn	Gly					500	505	

<210> 23

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 23

cttagcttct tccttcaatc

20

<210> 24

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

<400> 24

tttctagact cgagtgaaca gttgtttcat gac

33

<210> 25

<211> 497

<212> PRT

<213> Mus musculus

<400> 25

Met Gly Asp Arg Gly Gly Ala Gly Ser Ser Arg Arg Arg Thr Gly Ser
1 5 10 15

Arg Val Ser Val Gln Gly Gly Ser Gly Pro Lys Val Glu Glu Asp Glu
20 25 30

Val Arg Asp Ala Ala Val Ser Pro Asp Leu Gly Ala Gly Gly Asp Ala
35 40 45

Pro Ala Pro Ala Pro Ala Pro Ala His Thr Arg Asp Lys Asp Gly Arg
50 55 60

Thr Ser Val Gly Asp Gly Tyr Trp Asp Leu Arg Cys His Arg Leu Gln
65 70 75 80

Asp Ser Leu Phe Ser Ser Asp Ser Gly Phe Ser Asn Tyr Arg Gly Ile
85 90 95

Leu Asn Trp Cys Val Val Met Leu Ile Leu Ser Asn Ala Arg Leu Phe
100 105 110

Leu Glu Asn Leu Ile Lys Tyr Gly Ile Leu Val Asp Pro Ile Gln Val
115 120 125

Val Ser Leu Phe Leu Lys Asp Pro Tyr Ser Trp Pro Ala Pro Cys Val
130 135 140

Ile Ile Ala Ser Asn Ile Phe Val Val Ala Ala Phe Gln Ile Glu Lys
145 150 155 160

Arg Leu Ala Val Gly Ala Leu Thr Glu Gln Met Gly Leu Leu Leu His
165 170 175

Val Val Asn Leu Ala Thr Ile Ile Cys Phe Pro Ala Ala Val Ala Leu
180 185 190

Leu Val Glu Ser Ile Thr Pro Val Gly Ser Val Phe Ala Leu Ala Ser
195 200 205

Tyr Ser Ile Met Phe Leu Lys Leu Tyr Ser Tyr Arg Asp Val Asn Leu
210 215 220

Trp	Cys	Arg	Gln	Arg	Arg	Val	Lys	Ala	Lys	Ala	Val	Ser	Thr	Gly	Lys	
225					230					235					240	
Lys	Val	Ser	Gly	Ala	Ala	Ala	Gln	Gln	Ala	Val	Ser	Tyr	Pro	Asp	Asn	
				245					250					255		
Leu	Thr	Tyr	Arg	Asp	Leu	Tyr	Tyr	Phe	Ile	Phe	Ala	Pro	Thr	Leu	Cys	
			260					265					270			
Tyr	Glu	Leu	Asn	Phe	Pro	Arg	Ser	Pro	Arg	Ile	Arg	Lys	Arg	Phe	Leu	
		275					280					285				
Leu	Arg	Arg	Val	Leu	Glu	Met	Leu	Phe	Phe	Thr	Gln	Leu	Gln	Val	Gly	
	290					295					300					
Leu	Ile	Gln	Gln	Trp	Met	Val	Pro	Thr	Ile	His	Asn	Ser	Met	Lys	Pro	
305					310					315					320	
Phe	Lys	Asp	Met	Asp	Tyr	Ser	Arg	Ile	Ile	Glu	Arg	Leu	Leu	Lys	Leu	
				325					330					335		
Ala	Val	Pro	Asn	His	Leu	Ile	Trp	Leu	Ile	Phe	Phe	Tyr	Trp	Phe	Phe	
			340					345					350			
His	Ser	Cys	Leu	Asn	Ala	Val	Ala	Glu	Leu	Leu	Gln	Phe	Gly	Asp	Arg	
		355					360					365				
Glu	Phe	Tyr	Arg	Asp	Trp	Trp	Asn	Ala	Glu	Ser	Val	Thr	Tyr	Phe	Trp	
	370					375					380					
Gln	Asn	Trp	Asn	Ile	Pro	Val	His	Lys	Trp	Cys	Ile	Arg	His	Phe	Tyr	
385					390					395					400	
Lys	Pro	Met	Leu	Arg	His	Gly	Ser	Ser	Lys	Trp	Val	Ala	Arg	Thr	Gly	
				405					410					415		
Val	Phe	Leu	Thr	Ser	Ala	Phe	Phe	His	Glu	Tyr	Leu	Val	Ser	Val	Pro	
			420					425					430			
Leu	Arg	Met	Phe	Arg	Leu	Trp	Ala	Phe	Thr	Ala	Met	Met	Ala	Gln	Val	
		435					440					445				
Pro	Leu	Ala	Trp	Ile	Val	Gly	Arg	Phe	Phe	Gln	Gly	Asn	Tyr	Gly	Asn	
	450					455					460					
Ala	Ala	Val	Trp	Val	Thr	Leu	Ile	Ile	Gly	Gln	Pro	Val	Ala	Val	Leu	
465					470					475					480	
Met	Tyr	Val	His	Asp	Tyr	Tyr	Val	Leu	Asn	Tyr	Asp	Ala	Pro	Val	Gly	
				485					490					495		

Val

<210> 26

<211> 520

<212> PRT

<213> Arabidopsis thaliana

<400> 26

Met	Ala	Ile	Leu	Asp	Ser	Ala	Gly	Val	Thr	Thr	Val	Thr	Glu	Asn	Gly	
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Gly Gly Glu Phe Val Asp Leu Asp Arg Leu Arg Arg Arg Lys Ser Arg
 20 25 30
 Ser Asp Ser Ser Asn Gly Leu Leu Leu Ser Gly Ser Asp Asn Asn Ser
 35 40 45
 Pro Ser Asp Asp Val Gly Ala Pro Ala Asp Val Arg Asp Arg Ile Asp
 50 55 60
 Ser Val Val Asn Asp Asp Ala Gln Gly Thr Ala Asn Leu Ala Gly Asp
 65 70 75 80
 Asn Asn Gly Gly Gly Asp Asn Asn Gly Gly Gly Arg Gly Gly Gly Glu
 85 90 95
 Gly Arg Gly Asn Ala Asp Ala Thr Phe Thr Tyr Arg Pro Ser Val Pro
 100 105 110
 Ala His Arg Arg Ala Arg Glu Ser Pro Leu Ser Ser Asp Ala Ile Phe
 115 120 125
 Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Val Val Val Leu Ile
 130 135 140
 Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly Trp
 145 150 155 160
 Leu Ile Arg Thr Asp Phe Trp Phe Ser Ser Arg Ser Leu Arg Asp Trp
 165 170 175
 Pro Leu Phe Met Cys Cys Ile Ser Leu Ser Ile Phe Pro Leu Ala Ala
 180 185 190
 Phe Thr Val Glu Lys Leu Val Leu Gln Lys Tyr Ile Ser Glu Pro Val
 195 200 205
 Val Ile Phe Leu His Ile Ile Ile Thr Met Thr Glu Val Leu Tyr Pro
 210 215 220
 Val Tyr Val Thr Leu Arg Cys Asp Ser Ala Phe Leu Ser Gly Val Thr
 225 230 235 240
 Leu Met Leu Leu Thr Cys Ile Val Trp Leu Lys Leu Val Ser Tyr Ala
 245 250 255
 His Thr Ser Tyr Asp Ile Arg Ser Leu Ala Asn Ala Ala Asp Lys Ala
 260 265 270
 Asn Pro Glu Val Ser Tyr Tyr Val Ser Leu Lys Ser Leu Ala Tyr Phe
 275 280 285
 Met Val Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg Ser Ala
 290 295 300
 Cys Ile Arg Lys Gly Trp Val Ala Arg Gln Phe Ala Lys Leu Val Ile
 305 310 315 320
 Phe Thr Gly Phe Met Gly Phe Ile Ile Glu Gln Tyr Ile Asn Pro Ile
 325 330 335

Val	Arg	Asn	Ser	Lys	His	Pro	Leu	Lys	Gly	Asp	Leu	Leu	Tyr	Ala	Ile	
			340				345						350			
Glu	Arg	Val	Leu	Lys	Leu	Ser	Val	Pro	Asn	Leu	Tyr	Val	Trp	Leu	Cys	
			355				360						365			
Met	Phe	Tyr	Cys	Phe	Phe	His	Leu	Trp	Leu	Asn	Ile	Leu	Ala	Glu	Leu	
			370				375						380			
Leu	Cys	Phe	Gly	Asp	Arg	Glu	Phe	Tyr	Lys	Asp	Trp	Trp	Asn	Ala	Lys	
385				390						395			400			
Ser	Val	Gly	Asp	Tyr	Trp	Arg	Met	Trp	Asn	Met	Pro	Val	His	Lys	Trp	
			405						410			415				
Met	Val	Arg	His	Ile	Tyr	Phe	Pro	Cys	Leu	Arg	Ser	Lys	Ile	Pro	Lys	
			420						425			430				
Thr	Leu	Ala	Ile	Ile	Ile	Ala	Phe	Leu	Val	Ser	Ala	Val	Phe	His	Glu	
			435						440			445				
Leu	Cys	Ile	Ala	Val	Pro	Cys	Arg	Leu	Phe	Lys	Leu	Trp	Ala	Phe	Leu	
			450						455			460				
Gly	Ile	Met	Phe	Gln	Val	Pro	Leu	Val	Phe	Ile	Thr	Asn	Tyr	Leu	Gln	
465				470						475			480			
Glu	Arg	Phe	Gly	Ser	Thr	Val	Gly	Asn	Met	Ile	Phe	Trp	Phe	Ile	Phe	
			485						490			495				
Cys	Ile	Phe	Gly	Gln	Pro	Met	Cys	Val	Leu	Leu	Tyr	Tyr	His	Asp	Leu	
			500						505			510				
Met	Asn	Arg	Lys	Gly	Ser	Met	Ser									
			515			520										